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nations occur at the junction of the Trenton and Hudson River formations.

The above section occurs on the east side of a small open valley. On the west side of the same valley the foot of the bare front of the hill consists of quartzite, dipping slightly to the north-westward, as if one side of a very gentle anticlinal of which the rock of the Devany quarry is the opposite. The quartzite, although hard and generally pure, contains a layer of mica schist ten inches thick which becomes pure quartzite a hundred feet to the eastward. Above the quartzite follows gneiss, which continues westward three miles, in a shallow synclinal, to Great Barrington, and there this gneiss is overlaid by a second thick stratum (100 feet or so) of quartzite. Here, then, there are two strata of quartzite separated by two or three hundred feet of gneiss, the whole overlying the Stockbridge limestone. The gneiss is a very firm rock, covering the slopes in some places with blocks like houses in size, where upturned through the growth of trees. I had suspected that it was one of the older gneisses of New England, until I found that it was overlaid by quartzite, and, on tracing further the stratification, proved that it belongs unquestionably to the series of rocks newer than the limestone.

From the facts which have been presented it follows that all old-looking Green Mountain gneisses are not præ-silurian, and, further, that the presence of staurolite is no evidence of a præ-silurian age.

NOTE ON BUFO AMERICANUS.*

BY REV. DR. THOMAS HILL.

THIS note is intended as a contribution toward the psychology of the American toad; simply presenting some evidences of intelligence and of capacity for learning to which I have been witness.

In the summers of 1843-5, an old toad used to sit under the door of a beehive every fine evening, and dextrously pick up those bees which, overladen or tired, missed the doorstep and fell to the

* Read at the Portland Meeting of the Amer. Assoc. Adv. Sci.*

ground. He lost, by some accident, one eye, and it was observed by several members of the family, as well as myself, that he had with it lost his ability to pick up a bee at the first trial; his tongue struck the ground on one side the bee: but after several weeks' practice with one eye he regained his old certainty of aim.

I have never seen our toad use his hands to crowd his food into his mouth as the European toad is said to do; although he uses them freely to wipe out of his mouth any inedible or disagreeable substance. When our toad gets into his mouth part of an insect too large for his tongue to thrust down his throat (and I have known of their attempting full grown larvæ of *Sphinx quinquemaculatus*, and even a wounded hummingbird) he resorts to the nearest stone or clod and presses the protruding part of his mouthful against it and thus crowds it down his throat. This can be observed at any time by entangling a locust's hind legs together and throwing it before a small toad.

On one occasion I gave a "yellow-striped" locust to a little toad in its second summer, when he was in the middle of a very wide gravel walk. In a moment he had the locust's head down his throat, its hinder parts protruding; and looked around for a stone or clod, but finding none at hand, in either direction, he bowed his head, and crept along, pushing the locust against the ground. But the angle with the ground was too small and my walk too well rolled. To increase the angle he straightened his hind legs up, but in vain. At length he threw up his hind quarters, and actually stood on his head, or rather on the locust sticking out of his mouth,—and after repeating this once or twice succeeded in "getting himself outside of his dinner."

But these instances of ingenious adaptation to the circumstances, were exceeded by a toad about four years old at Antioch college. I was tossing him earth worms while digging, and presently threw him so large a specimen that he was obliged to attack one end only. That end was instantly transferred to his stomach, the other end writhed free in air, and coiled about the toad's head. He waited till its writhings gave him a chance, swallowed half an inch, then taking a nip with his jaws, waited for a chance to draw in another half-inch. But there were so many half-inches to dispose of that at length his jaws grew tired, lost their firmness of grip, and the worm crawled out five-eighths of an inch, between each half-inch swallowing. The toad, perceiving this, brought his

right hind foot to aid his jaws, grasping his abdomen with his foot, and, by a little effort, getting hold of the worm in his stomach from the outside; he thus by his foot held fast to what he gained by each swallow, and presently succeeded in getting the worm entirely down.

A garter-snake was observed this summer in North Conway pushing a toad down his throat by running it against clods and stones; just as the toad crowds down a locust.

The amount which a toad can eat is surprising. One Tuesday morning I threw a *Coreus tristis* to a young toad, he snapped it up, but immediately rejected it, wiped his mouth with great energy, and then hopped away with extraordinary rapidity. I was so much amused that I gathered some more of the same bug and carried them to a favorite old toad at the northeast corner of my house. He ate them all without making any wry faces. I gathered all that I could find on my vines, and he ate them all, to the number of twenty-three. I then brought him some larvæ of *Pygæra ministra*, three-quarters grown, and succeeded in enticing him to put ninety-four of them on top of his squash bugs. Finding that his virtue was not proof against the caterpillars when I put them on the end of a straw and tickled his nose with them, he at length turned and crept under the piazza, where he remained until Friday afternoon, digesting his feast.

A gentleman having read this paper told me he had seen the toad tuck in the last inch of an earth worm with his hand, European fashion. I then remembered that I have several times seen our toad put the last quarter-inch of earthworms in with his hand; but never saw him take his hand to a locust.

ON SECTION AVICULARIA OF THE GENUS *POLYGONUM*.

BY SERENO WATSON.

MEISNER's *Polygonum* § *Avicularia* is equivalent nearly to section *Polygonum* of Linnæus, the original genus *Polygonum* of Tournefort and Adanson, to which Linnæus added, as coördinate sections, *Persicaria*, *Bistorta* and some other old genera. Its most dis-